Scholars Academic Journal of Biosciences (SAJB) **ISSN 2321-6883 (Online)**
Sch. Acad. J. Biosci., 2015; 3(4):325-327 **ISSN 2347-9515 (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublisher.com

Research Article

The Effect of Allogenic Freeze Dried Platelet- Rich Plasma in Immunological Responses of Rabbits

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Abstract: This study aims to analyze the effects of allogenic freeze-dried platelet-rich plasma (PRP) in immunological responses of rabbits. This study employed a design of conducting one pre-post test group to determine the effect of freeze drying on levels of TGF-β1 PRP and the post test design was only for control group conducted to determine the effect of allogenic freeze-dried PRP. Levels of TGF-β1 before and after freeze drying from nine samples of PRP were examined which were obtained from blood centrifugation of three rabbits. These nine samples were used as allogenic donor injected intramuscularly in nine rabbits for the treatment groups. The control group used nine rabbits injected intramuscularly using autologous PRP. Inflammatory response and increasing levels of IgM were observed from both groups resulted in data which were then tested statistically using independent T-test. Measurement of TGF-β1 levels before and after freeze drying were tested statistically using T- test dependent. The results showed that freeze drying process did not affect levels of TGF-β1. Allogenic freeze-dried PRP did not cause an inflammatory response in addition to not increasing levels of IgM.
Keywords: autologous, allogenic, freeze dried platelet rich plasma, transforming growth factor -β1, IgM.

INTRODUCTION

The use of platelet-rich plasma (PRP) in tissue regeneration has developed as the more number of research and application in the clinical. Platelets are fragments formed cytoplasm of megakaryocytes in the bone marrow. Platelets are the smallest parts of the blood cells, round or oval and with no core, but contain a number of organelles. The structure consists of mitochondria, microtubules and 50-80 grains of granules (α, δ, λ). A granular α has more than 30 bioactive proteins, chemokines and various growth factors such as Transforming Growth Factor β (TGF-β), Platelet Derived Growth Factor (PDGF), vascular endothelial growth factor(VEGF), insulin-like growth Factor (IGF), Fibroblast growth Factor (FGF) [3]. These growth factors can be used for tissue repair therapies in various branches of medicine such as oral surgery, plastic surgery, craniofacial surgery, cardiac surgery, orthopedics, neurology, sports medicine, and dermatology [2].

In the case of tissue repair, growth factor such as TGF-β stimulates fibroblasts and increases extra cellular matrix formation (ECM). Transforming Growth Factor – β also increases collagens for wound healing process. Other growth factor such as PDGF also functions in the repair of bone tissue by stimulating the production of collagen type1, which induces the synthesis of bone [5]. In the process of tissue repair tendon IGF can stimulate the proliferation and differentiation of myeloblast [4].

In general, platelets are used for clinical applications derived from the patient's own (autologous). The use of autologous products can eliminate immunologic reactions and disease transmission [1]. However, autologous therapy cannot be performed in patients with a deficiency or abnormality of platelet function. This leads to the use of autologous in large variability, because the platelet concentration varies between individuals. Thus, it is difficult to evaluate the results scientifically [6]. Some patients also do not have the courage to do blood sampling in large numbers. Therefore, the use of allogenic PRP (derived from other individuals within a species) is needed as an alternative to growth factor therapy.

This study aims to analyze the effects of allogenic freeze-dried platelet-rich plasma in immunological responses of rabbits. The immunological response were observed from inflammatory response and increasing level of IgM